



**National Transportation Safety Board**

Office of Railroad, Pipeline and Hazardous Materials Investigations  
Human Performance and Survival Factors Division  
Washington, DC. 20594

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Survival Factors<sup>1</sup> Factual Report – Addendum # 3

Exhibit 1.

Publications and a Training Aid Supportive of the  
“Government Liaison - Emergency Response Program”<sup>2</sup>

Supporting Documentation – Emergency Preparedness / Response

July 16, 2008

*Failure of Dixie Pipeline Company Pressurized Underground Transmission Pipeline, and  
Subsequent Liquid Propane Release and Fire, near Carmichael, MS, on November 1, 2007*

NTSB Accident Number: DCA 08 MP 001

Compiled by: Richard M. Downs, Jr.  
Mechanical Engineer (Crashworthiness)  
Investigator / Survival Factors – Working Group Chairperson

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<sup>1</sup> The scope of the Survival Factors Factual Report [in pipeline accident investigations] exclusively addresses the emergency preparedness and response, and injury causation aspects of the investigation.

<sup>2</sup> ref. Survival Factors Factual Report; see § 6.9.1.h.

Contents<sup>3</sup> (commencing on the following page):

<u>Attachment</u>	<u>Title</u>
(a)	<p>“The Pipeline Group<sup>®</sup> Emergency Response Manual”<sup>4</sup></p> <p>cover page [of the document]</p> <p>Table of Contents page</p> <p>Message to All Emergency Responders</p> <p>Recommended Safety Procedures for Emergency Response Agencies in case of a Pipeline Emergency</p> <p>Information specific to “Dixie Pipeline Company”:</p> <p>Emergency Response Capabilities</p> <p>Example Warning Marker Sign</p> <p>Schematic Map of Dixie Pipeline Company in Choctaw County (AL)</p> <p>Schematic Map of Dixie Pipeline Company in Clarke and Wayne Counties</p> <p>Information specific to “Enterprise Products Operating L.P.”:</p> <p>Enterprise Products Operating L.P. Emergency Contact Information Sheet</p> <p>Example Warning Marker Post</p> <p>Enterprise Products Operating L.P. Contact Information Sheet</p>
(b)	<p>“General Information Guide to a Pipeline Emergency”<sup>5</sup></p> <p>cover pages [of the document; front and back]</p> <p>Table of Contents</p> <p>Introduction</p> <p>General Information</p> <p>Damage Prevention</p> <p>Products in Pipelines</p> <p>Recommended Safety Procedures</p> <p>Fact Sheet list [for the 36 product commodities addressed in the booklet]</p> <p>Disclaimer</p> <p>Fact Sheet for propane [as an exemplar for the 36 commodities Listed]</p>

<sup>3</sup> This transmittal is comprised of select pages of the identified publication, as deemed applicable to the topics / issues examined in the Survival Factors Investigation

<sup>4</sup> the supplied document, comprised of 99 total pages, contained information pages for a number of pipeline companies that operate within the constituent eight counties (in Mississippi and Alabama) that were addressed in the identified “Government Liaison - Emergency Response Program” familiarization activity program (as attended by the jurisdictional emergency response agencies), in which, for purposes of demonstrating exemplary document content, only the pages applicable to the Investigation [12 pages, total] are included in this report (e.g. as cited under this Attachment Title).

<sup>5</sup> the supplied document, comprised of 95 total pages, contained information pages for a number of product commodities [of consideration in pipeline emergencies], in which, for purposes of demonstrating exemplary document content, only pages applicable to the Investigation [12 (double-sheet) pages, total] are included in this report (e.g. as cited under this Attachment Title).

# The Pipeline Group®

## Emergency Response Manual

for

EMERGENCY RESPONSE PERSONNEL

of

CLARKE, JASPER, KEMPER, LAUDERDALE, NESHOPA, NEWTON and SCOTT COUNTIES in  
MISSISSIPPI; CHOCTAW COUNTY in ALABAMA

### Sponsored by

Atmos Energy Corp-MS Division  
CenterPoint Energy  
Colonial Pipeline Company  
Crosstex Energy Services  
Destin Pipeline/bp Pipelines, (North America) Inc.  
Dixie Pipeline Company  
El Paso Pipeline Group/Southern Natural Gas Company/Tennessee Gas Pipeline Company  
Enbridge Processing (Mississippi) Inc.  
Enterprise Products Operating L.P.  
Gulf South Pipeline Company, L.P.  
Plains Pipeline, L.P.  
Plantation Pipe Line Company

April 5, 2007  
Meridian, Mississippi

# THE PIPELINE GROUP®

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### MERIDIAN, MISSISSIPPI EMERGENCY RESPONSE PROGRAM

Presented by:

#### THE PIPELINE GROUP

4400 N. Big Spring, Ste. B-21  
Midland, Texas 79705  
[www.pipelinegroup.com](http://www.pipelinegroup.com)

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# THE PIPELINE GROUP® MESSAGE TO ALL EMERGENCY RESPONDERS

This manual is being provided to your organization so that you might gain a greater understanding of the pipelines that operate in this area and what you should know if ever called upon to respond to a pipeline emergency.

You will find that each sponsoring company has designated an individual that you may contact if you need further information regarding that company. You are asked to keep this manual in a location readily available for reference by all your personnel. You will be invited to a similar program annually in order to keep the manual updated.

On occasion we have asked that you remove a pipeline company section of material from your emergency response manual, stating that the information was not updated. We did not elaborate further. Recently we have been asked to explain our procedures.

## *The programs of the pipeline group are two fold.*

(1) We promote pipeline safety via dinners for those engaged in excavation activities, and

(2) We promote public awareness via lunches for Emergency Responders and Public Officials

Most buried pipelines are regulated by federal or state authorities, and use the Pipeline Group services on a pay as you use basis.

There is a constant change in ownership, management names, telephone numbers etc. of pipeline companies. To make sure

you had the best information available we adopted a policy in the beginning of removing from our records any information that was not updated yearly. That policy was and is well understood by the pipeline industry. They understood we could not and should not be responsible for outdated information. If they wished to pay the nominal fee for our services the information would be updated. If they did not wish to pay, the information would be withdrawn.

In some cases pipelines have been sold. We are not always aware of the new owner. We assume they utilize some other media to put their company information in your hands. Others are taken out of service for various reasons and the operator feels it is not important to use our services. Others simply discontinue the use of our services.

We will attempt in the future to make a brief statement as to why the information is being removed.

We appreciate your attendance here today and hope this program and manual benefits your organization. If you have any questions please call.

THE PIPELINE GROUP®

**THE PIPELINE GROUP®**  
**RECOMMENDED SAFETY PROCEDURES**  
**FOR PUBLIC EMERGENCY RESPONSE AGENCIES**  
**IN CASE OF A PIPELINE EMERGENCY**

1. Validate the emergency phone call by returning the call promptly. Do this even when the caller is a pipeline company employee.
2. Call the pipeline company Dispatcher. Their phones are manned 24 hours a day, 365 days a year. The Dispatcher will direct emergency procedures and suggest what you can do. Your call will be validated.
3. Do not call pipeline company personnel other than the emergency number. Local pipeline company employees are instructed to call the Dispatcher in the event of a pipeline emergency.
4. Determine the wind direction on your way to the site.
5. Upon arrival at the emergency site, do not drive into any vapor cloud. Park vehicles a safe distance from vapor clouds or fires. Turn off engines. Stay away from vapor cloud - DO NOT WALK INTO IT.
6. Evacuate everyone from the danger area to an upwind location.
7. Provide medical help to those who need it.
8. Barricade the emergency area so that people will not enter it. Blockade any highway which passes through or near the area.
9. ELIMINATE ALL SOURCES OF IGNITION if there is a vapor cloud - sources such as: engines, electric motors, pilot lights, burn barrels and smoking materials.
10. Maintain contact with the pipeline company personnel until they arrive. The person in charge will identify himself.
11. Do NOT attempt to extinguish any primary fire source until pipeline company employees arrive and their representative directs this action. Perimeter fires may be extinguished at your discretion.
12. Request additional emergency assistance from other Public Response Agencies when you need it.
13. If a railroad passes through the emergency area, contact the railroad and request that they stop movement of trains through the area until notified that the area is safe.
14. Determine if the vapor cloud is moving or expanding in size. The vapors will tend to flow to low areas. Keep people away from nearby low spots if the vapor cloud is at a nearby high elevation.
15. Do not put water or other chemicals on vapor cloud unless directed to do so by pipeline company personnel.
16. Do not attempt to ignite the vapor cloud. This dangerous procedure will usually be done by a pipeline company employee using a flare gun.
17. If the engine of your vehicle stops unexpectedly, do not attempt to start it until you are certain it did not stop due to lack of oxygen.
18. A pipeline company employee will tell you when the emergency is over.

# **Dixie Pipeline Company**

## **Emergency Response Capabilities**

### **COMMITMENT**

Dixie Pipeline Company is committed to the protection of the public and the environment through the safe operation and maintenance of its pipeline systems. Dixie's qualified personnel are trained in emergency response activities and regularly participate in drills and exercises reflecting various types of response levels, emergency scenarios, topographic terrain and environmental sensitivities.

Dixie has committed the necessary resources to fully prepare and implement its emergency response plans and has obtained through contract the necessary private personnel and equipment to respond, to the maximum extent practicable, to a "worst case" discharge or substantial threat of such a discharge.

### **COMMUNICATIONS**

Dixie utilizes its 24-hour Pipeline Control Center (1-800-349-4377) as a hub of communications in emergency response situations. The Control Center has a vast catalog of resources and capabilities. On-site communications are conducted using cellular telephones, 6GigHz analog 120 channel microwave radios (in Company vehicles), portable Motorola Radios and/or land-line telephone systems from Company facilities and offices.

### **INCIDENT COMMAND SYSTEM**

Dixie utilizes an expandable Incident Command System. Depending upon the size and complexity of an incident, additional Company or contract personnel may be added as needed. Additional federal, state or local agencies may be integrated into the Incident Command System by utilizing a Unified Command Structure.

**For more information regarding Dixie's emergency response plans and procedures, call John Sullivan @ (601)544-5451, or the Safety Coordinator, Ron Hill @ (225)572-7793.**



DESTRUCTION OF THIS SIGN IS A GENERAL OFFENSE WITH A MAXIMUM FINE  
OF \$5000.00 AND / OR IMPRISONMENT OF UP TO ONE YEAR FOR EACH OFFENSE

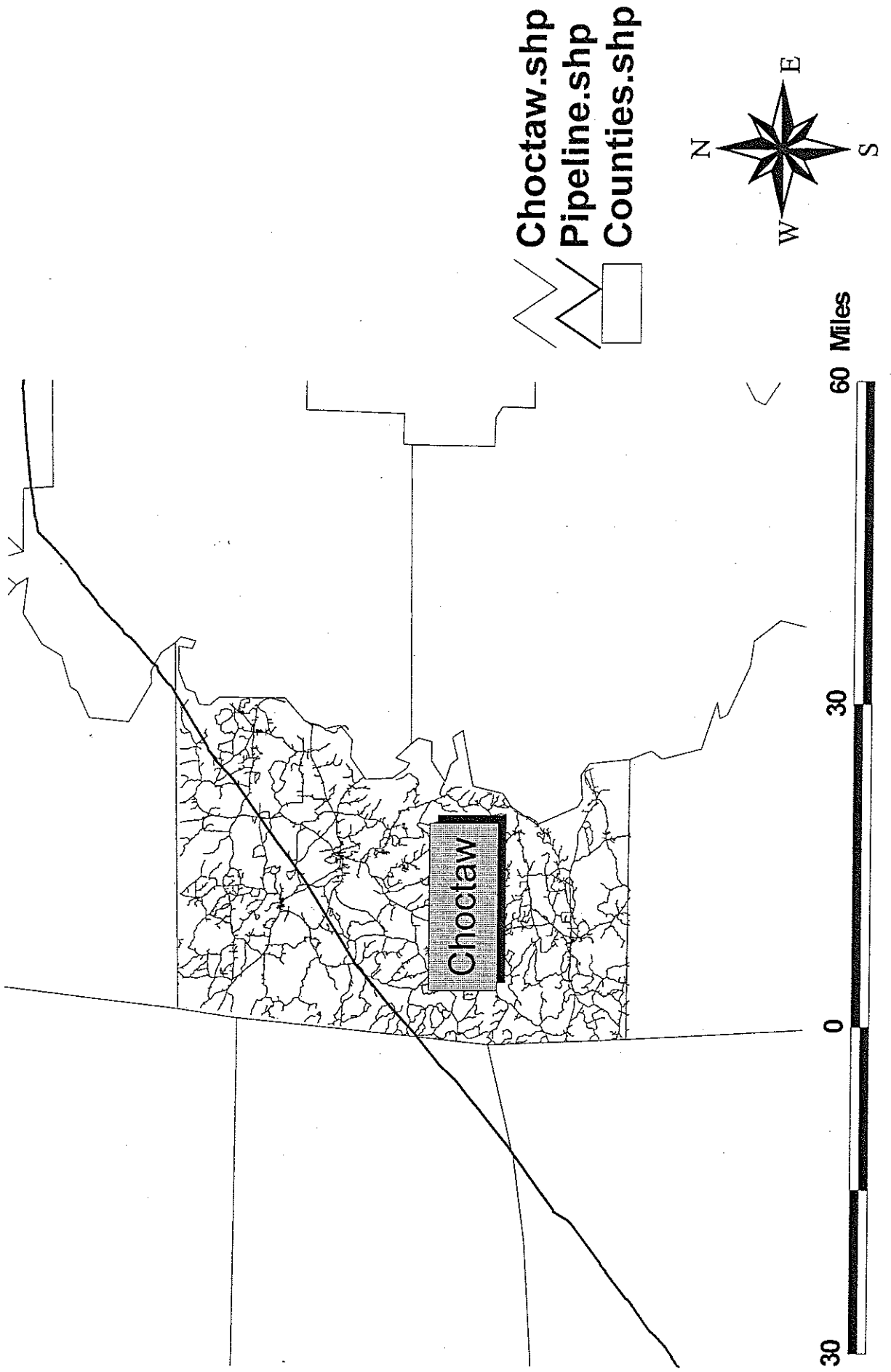


# PROANE PIPELINE

**BEFORE EXCAVATING OR IN EMERGENCY  
CALL DIXIE PIPELINE CO.**

**1-800-DIXIE-77  
1-800-349-4377**

# Dixie Pipeline Company

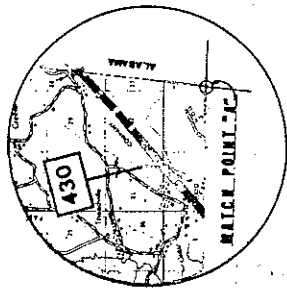


ISED 9-15-72

SHEET 14 OF 42

CLARKE COUNTY

MATCH POINT "C"  
SEE INSET



INSET

WAYNE COUNTY

MISSISSIPPI

SCALE: 1"=2 MILES

72

71

70

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68

XIE PIPELINE COMPANY



# Enterprise Products Operating L.P.

[www.EPPLP.com](http://www.EPPLP.com)

To report an emergency call:

**1-800-203-1347**

**1-601-545-2114**

For additional information call:

Sammy Thigpen  
Enterprise Products Operating L.P.  
P.O. Box 1183  
Petal, Mississippi 39465  
(601) 545-2114

Enterprise Products Operating L.P. operates facilities in the following counties of this program area:

**CLARKE  
JASPER**

Materials transported are:

**NATURAL GAS [Guide #115]**

A fact sheet on the above materials can be found in Appendix 1 of this manual.



NOTICE: FEDERAL OFFENSE TO  
DEFACE, DAMAGE, OR DESTROY  
THIS SIGN. UP TO \$5000 FINE, ONE  
YEAR IMPRISONMENT OR BOTH.

# WARNING PIPELINE

**PETAL  
GAS STORAGE**

**BEFORE DIGGING CALL  
1-601-545-2114**

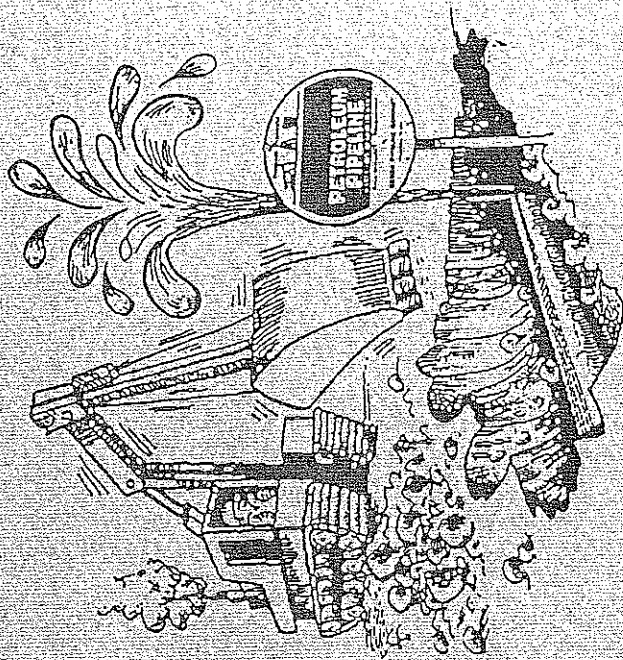
**EMERGENCY  
1-800-203-1347**

**FOR MORE INFORMATION  
REGARDING THE LOCATION  
OF ENTERPRISE PRODUCTS  
OPERATING L.P. PLEASE  
CONTACT  
SAMMY THIGPEN AT  
(601) 545-2114**



# *The Pipeline Group<sup>®</sup>*

## *General Information Guide to A Pipeline Emergency*



*The Pipeline Group  
4400 N. Big Spring, Suite B-21  
Midland, Texas 79705*

## TABLE OF CONTENTS

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General Information

Damage Prevention

Products in Pipelines

Recommended Safety Procedures

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Fact Sheets



## **INTRODUCTION**

This guidebook was developed for use by first responders such as firefighters, police, and emergency services personnel for use in the transportation industry. It is a guide for initial action to be taken to protect yourself and the general public when you are called to handle incidents involving hazardous materials. The information is for guidance, primarily during the initial phase of an incident. If additional assistance for handling of such an incident is desired, you may call the NATIONAL RESPONSE CENTER (NRC) at 1-800-424-8802 or CHEMTREC at 1-800-424-9300.

The NRC and CHEMTREC work cooperatively to provide 24-hour assistance to emergency responders. Both centers provide this information and assistance through toll-free numbers.

While the NRC and CHEMTREC work together, there are some differences in the services provided. The NRC is the single Federal government center to which releases of hazardous substances should be reported. Federal law requires that anyone who releases a reportable quantity of a hazardous substance into the environment must immediately notify the NRC.

CHEMTREC is a service of the chemical industry which ensures that the industry's capabilities are available in emergency situations. Callers can be transferred between NRC and CHEMTREC to obtain the needed service.

The caller to either center should attempt to provide as much of the following information as possible. (Callers should use the centers even if minimal information is available.)

- Caller name and call back number
- Name of carrier, shipper/manufacturer or facility operator and responsible party
- Nature, location and time of the incident

- Name of material released or any identifying information
- Container type, rail car/truck number, vessel name, or other identifying information

The information from this guidebook should be augmented by expert technical advice as soon as you have assessed the situation and have seen the immediate needs of the people involved. The shipper or manufacturer of the material can usually be contacted through CHEMTREC for assistance on the material. Government specialists can be contacted through the NRC.

This guidebook can assist you in making decisions, but you can not consider it to be a substitute for your own knowledge or judgment. This distinction is important since the recommendations are adequate or applicable in all cases.

As a first responder at the scene of a hazardous materials incident, seek additional and more specific information about any material in question as soon as possible. Be familiar with this guidebook before you actually need to use it in an emergency response situation.

## **GENERAL INFORMATION**

This Pipeline Group booklet is being provided by the sponsoring companies of today's program. It is to insure that all emergency responders from your department have information relevant to pipeline emergencies.

In the past one Pipeline Group Emergency Response Manual was issued to the principal authority of your department, e.g., Fire Chief, Police Chief, State Patrol Troop Captain, L.E.P.C., etc. We hoped information contained in the manual would be shared by all in the department. It has come to our attention that has not always been the case; therefore, we have prepared this booklet for all those attending today's program. It may be kept with you at all times or shared with others. It is anticipated that updates to this booklet will occur yearly.

You will note that each Fact Sheet is numbered. These numbers are for internal control and have nothing to do with the product above the number. The Fact Sheets contained herein were compiled from known products that are transported in pipelines. These products are not necessarily transported in your area. You should use The Pipeline Group's Emergency Response Manual to determine what is carried by the pipeline companies who sponsor this program.

## **Damage Prevention**

A question often asked is, where are pipelines located? Pipelines are not normally visible. They are located under streets or buried under ground in rights-of-way. The rights-of-way are created by an easement or permit. Line markers are used to show a pipeline's approximate location. These markers do not indicate the depth of the pipeline, nor is the pipeline necessarily laid in a straight line between the markers.

Pipeline companies vigorously adhere to and support damage prevention programs. To protect pipelines, other underground utilities, the public and the environment, companies fly over their lines on average of twice monthly to insure no encroachment or digging near their lines or the communication lines that support their system is taking place. Additionally, pipeline companies have developed damage prevention programs that generally consist of belonging to excavation notification systems known as "One Call". They also conduct education programs for contractors and public officials who are engaged in excavation activities. Some communication companies also sponsor these education programs. When you call the appropriate number, "One Call" notifies all subscribing companies. The appropriate company will send a representative to the proposed excavation site to mark the location of the buried pipeline or utility at no cost to you.

The "One Call" System should be contacted at least 48 hours before excavating for any project such as fences, light poles, landscaping and sprinkler systems, foundations, swimming pools, ground clearing, grading, deep plowing, laying underground pipe or wiring, etc. Calling before you dig, either by hand or with machinery, could prevent accidents, injury and possible death.

Twenty-two percent of all pipeline accidents are caused by careless excavators who fail to make required notification to pipeline and underground utility operators of their proposed

excavation activities. This includes city, county, state, and private contractors.

Pipeline company control centers operate 24 hours per day and have responsibility for receiving calls regarding emergencies and dispatching personnel. The controllers monitor the system to insure that the integrity and performance are maximized. Communication cables play a vital part in that effort. Any disruption of that service can mean shutting down an entire system.

## **PRODUCTS IN PIPELINES**

Seldom are any two pipeline accidents the same; therefore one should always use great caution when responding to a pipeline emergency. It is hoped that during your career as an emergency responder that you will never be called to a pipeline emergency. In the event you are, please remember the following.

There are five major categories of products carried in pipelines:

- Natural Gas
- Crude Oil
- Liquid Petroleum Gas (LPG)
- Natural Gas Liquids (NGL)
- Refined Products (gasolines, diesels, heating oil and jet fuels)

Two lesser categories are:

- Carbon Dioxide (Co2)
- Anhydrous Ammonia

**NATURAL GAS** is non-toxic, non-poisonous and non-corrosive; however, it does have certain characteristics that affect its behavior and detection in emergency situations. Natural Gas is composed mostly of methane, with lesser portions of other hydrocarbons, nitrogen and atmosphere. Natural Gas is colorless, so we can see it only as a flame, or spray-like mist when released under high pressure.

Natural Gas is also odorless. When delivered to distribution companies from trunk lines, an odorant called Mercaptan is added so we can detect the presence of Natural Gas. By itself, Natural Gas does not ignite easily. It has a limited range of flammability, which means it will only burn in certain mixtures with air. Natural Gas burns when it reaches the concentration between 3.5% and 15% in the air. It will not burn below 3.5% concentration or above the 15% level; however, when Natural Gas is released in air, portions of the mixture may fall in this

range and become flammable. In the presence of an ignition source, a fire or explosion will occur. Ignition sources can be as obvious as an open flame or a burning cigarette. Or it can be as subtle as the movement of light switches, activation of hand-held radios and cellular telephones. The movement of a nylon wind breaker can be source of ignition. Parking of vehicles equipped with catalytic converters provide a source of ignition.

Natural Gas can be a suffocant. Natural Gas in large concentrations displaces oxygen and can cause suffocation. This can be dangerous in confined spaces such as deep excavations or in closed buildings.

**CRUDE OIL** is a naturally occurring black or dark brown mixture of hydrocarbons. To learn more about Crude Oil you must understand three very important physical characteristics - vapor density, specific gravity and the central characteristic flash point.

Vapor density is the weight comparison of the vapor produced by the material relative to an equal volume of air. Vapors with a density less than one are lighter than air and will rise when released. Vapors with a density of more than one are heavier than air and will fall. Crude oil has a vapor density greater than one.

Specific gravity is weight comparison of a fluid to water. Those substances which have gravity of more than one will sink in water. Those with less than one will float. Crude Oil has a specific gravity of less than one so it will float; therefore, if you try to extinguish a Crude Oil fire with water you would likely only spread it around and create a larger problem.

Flash point is the critical central characteristic to understand. This number defines the temperature to which a liquid must be heated to produce flammable vapors. Crude Oil flash point ranges between 20 degrees and 90 degrees.

**LIQUID PETROLEUM GAS (LPG) AND NATURAL GAS LIQUIDS (NGL'S)** are sometimes referred to as Liquefied

Hydrocarbons and considered highly volatile liquids (HVL's). Liquefied Hydrocarbons are chemical compounds made up of hydrogen and carbon atoms. They are gases at atmospheric conditions, but can be kept in a liquid state using pressure. At atmospheric temperatures and pressures the liquefied hydrocarbons are vapors, but with an application of pressure (no increase in temperature is necessary) these hydrocarbons are easily liquefied. While in pipelines and cylinder tanks they are kept under pressure. This maintains them in a liquid state. If released into the atmosphere they will quickly vaporize and form a vapor cloud in the vicinity of the release. The cloud will appear as a thick white steam cloud because vaporized gases are heavier than air. The vapor cloud will drift along the ground or settle in low lying areas.

If a vapor cloud comes in contact with an ignition source it can explode, and if allowed to drift an un-ignited highly flammable LPG or NGL cloud has the potential to create a very dangerous situation. In addition high concentrations of LPG or NGL vapors may pose a threat to people and the environment.

**MOTOR FUELS** have boiling points ranging from 80° F for Gasoline to 300° for Diesel and Jet Fuels. Motor Fuels have vapors releasing highly flammable gases which can be temporarily heavier than air depending on modifying conditions such as weather, time of day, and location. A large spill of Motor Fuels may or may not result in fire. Sometimes Motor Fuels will ignite causing a fire because of static electricity, open flames, operating equipment, etc. Motor Fuels when confined inside an enclosure, can displace the oxygen and become an asphyxiant. Vapors can accumulate and travel in low lying areas toward possible ignition sources and result in what is referred to as an "open-space explosion".

**CO2 (CARBON DIOXIDE)** is non-combustible and can be used as a fire extinguishing agent primarily for its smothering effect. Carbon Dioxide is a colorless, odorless gas and is an asphyxiant. Carbon dioxide is heavier than air and tends to settle in low places. In an enclosed building, Carbon Dioxide will tend to accumulate near the floor displacing the air upward and

creating an oxygen-deficient atmosphere. Such enclosures should be checked before entering. The boiling point of Carbon Dioxide is  $-109^{\circ}\text{F}$  ( $-78.5^{\circ}\text{C}$ ). In most pipelines, Carbon Dioxide is transported as a liquid. Carbon Dioxide will become a liquid at 755 psig at  $60^{\circ}\text{F}$  in a pipeline. Carbon Dioxide can also exist as a solid (Dry Ice). When Carbon Dioxide is released from pressurized system, as the liquid quickly turns into a gas it may cause freezing. This may even appear as snow or frost.

The OSHA eight (8) hour Permissible Exposure Limit (PEL) for Carbon Dioxide is 5000 ppm, the OSHA Short Term Exposure Limit (STEL) is 30,000 ppm, and the NIOSH Immediate Dangerous to Life and Health is 50,000 ppm.

**NOTE:** On a catastrophic failure of a Carbon Dioxide line, generally the line will blow-down very quickly.

**ANHYDROUS AMMONIA** is a colorless gas with a penetrating, suffocating odor; its chemical formula is  $\text{NH}_3$ . Ammonia has been known as a unique chemical substance since the days of alchemy, when it was prepared by heating the hoofs and horns of animals or by heating coal in the absence of air. In the early 1900's, Ammonia was still primarily obtained as a by-product of the heating of coal. Today, however, Ammonia is largely produced at large manufacturing plants, directly from hydrogen and atmospheric nitrogen. At elevated temperatures and pressures, these gases unite, as the following equation illustrates:



As a compressed gas, Ammonia can be transported by pipeline systems and is commercially available in steel cylinders and ton containers.

Ammonia is another fire gas. Emergency response personnel may encounter it when materials made from animal products are exposed to an intense source of heat, such as leather items or carpeting made from wool. But emergency response personnel are undoubtedly more likely to encounter the

vapors of Ammonia in situations where it is used commercially, or in transportation mishaps. The greatest commercial consumption of Ammonia is associated with the manufacture of fertilizers and in connection with its direct application to fields as fertilizer.

Ammonia is easily liquefied by applying low pressure to the confined gas. This form is called **ANHYDROUS LIQUID AMMONIA**, which is often stored in 20,000-lb tanks. It is also shipped to various destinations and transferred by pipeline, usually to consuming agricultural areas. Farmers can dispense the Anhydrous Ammonia directly to soil or irrigation waters. Typically, the Ammonia is discharged to the soil from a tractor saddle tank or nurse tank mounted behind the tillage tool through a distribution pod. Other than its popular use in agriculture, Anhydrous Liquid Ammonia may be encountered as a refrigeration in large refrigeration installations.

The vapor density of Ammonia is .59; hence, Ammonia is lighter than air and quickly disperses into the atmosphere when released from its container. Dispersal is even more rapid under windy climatic conditions. Although colorless, when first released to the atmosphere from its liquid storage tank or pipeline, Ammonia is generally visible as a white fog caused by condensed atmospheric moisture. This feature may permit detection of an Ammonia leak.

When large volumes of Liquid Ammonia are released to the atmosphere at once, as during a transportation accident, unusually large amounts of Ammonia gas can concentrate in the immediate area. It is critical in such situations to minimize exposure to this substance. Ammonia acts as an alkali on human skin. Its effect can range from mild irritation to tissue destruction, depending on the length of the exposure. The eyes and lungs are particularly susceptible to the caustic action on Ammonia. Eye contact causes an immediately noticeable irritation, which, if left unattended, could result in loss of sight. Ammonia also causes extreme irritation of the bronchial tissues when inhaled; continued inhalation destroys respiratory tissue,

which causes respiratory and pulmonary diseases. Elevated blood ammonia concentrations may cause death by suffocation.

Water is capable of absorbing large volumes of Ammonia. At room conditions, 1 volume of water absorbs 1176 volumes of Ammonia. This is an important factor to recall during emergencies involving Ammonia. Water can be applied directly to skin tissue in order to remove any Ammonia that has dissolved in surficial body fluids. Water can also be used to effectively disperse the Ammonia vapors. The latter is best accomplished by establishing a water curtain downwind from the point where Ammonia has been released to the atmosphere.

Ammonia is a flammable gas, but its flammable range is relatively narrow, only from 16% to 25% by volume. Its lower explosive limit is also relatively high. In combination, these factors reduce the likelihood of Ammonia fires. In oxygen, Ammonia burns with a weak yellow flame to form nitrogen and water.

## **The Pipeline Group**

### **Recommended Safety Procedures for Public Emergency Response Agencies In Case of a Pipeline Emergency**

1. Validate the emergency phone call by returning the call promptly. Do this even when the caller is a pipeline company employee.
2. Call the pipeline company Dispatcher. Their phones are manned 24 hours a day, 365 days a year. The Dispatcher will direct emergency procedures and suggest what you can do. Your call will be validated.
3. Do not call pipeline company personnel other than the emergency number. Local pipeline company employees are instructed to call the Dispatcher in the event of a pipeline emergency.
4. Determine the wind direction on your way to the site.
5. Upon arrival at the emergency site, do not drive into any vapor cloud. Park vehicles a safe distance from vapor clouds or fires. Turn off engines. Stay away from the vapor cloud. **DO NOT WALK INTO IT.**
6. Evacuate everyone from the danger area to an upwind location.
7. Provide medical help to those who need it.
8. Barricade the emergency area so that people will not enter it. Blockade any highway which passes through or near the area.
9. **ELIMINATE ALL SOURCES OF IGNITION** if there is a vapor cloud - sources such as: engines, electric motors, pilot lights, burn barrels and smoking materials.

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15. Do not put water or other chemicals on vapor cloud unless directed to do so by pipeline company personnel.
16. Do not attempt to ignite the vapor cloud. This dangerous procedure will usually be done by a pipeline company employee using a flare gun.
17. If the engine of your vehicle stops unexpectedly, do not attempt to start it until you are certain it did not stop due to lack of oxygen.
18. A pipeline company employee will tell you when the emergency is over.

## FACT SHEET LIST

### CHEMICAL(S)

CHEMICAL(S)	NUMBER
Alkylate (01)	01
Anhydrous Ammonia (02)	02
Benzene (03)	03
Butadiene (04)	04
n-Butane, Iso-Butane (05)	05
Butene, Mixed Butenes, Iso-Butene (06)	06
C5 Raffinate, "Sweet Naphtha" (07)	07
Carbon Dioxide (08)	08
Crude Oil (09)	09
Diesel, Kerosene, Heating & Fuel Oil (1,2) (10)	10
"DNG Furnace Feed" (11)	11
Ethane - Propane Mix (12)	12
Ethane (13)	13
Ethylene (14)	14
Gas Oil (15)	15
Gasoline (16)	16
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**DISCLAIMER**  
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The Pipeline Group

The Fact Sheets numbered 1 through 36 contained in this Booklet are a compilation of information from various MSDS sources. The material herein and the information is offered to you in good faith and is believed to be accurate. We have reviewed each sheet which we received from sources outside our company and believe the data to be correct; however, we cannot guarantee its accuracy or completeness. Health and safety precautions in this data may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this information for reference purposes. No warranty is made, either express or implied.

## PROPANE

### Chemical Names:

Propane, Propyl hydride, Dimethylmethane, LP Gas, LPG, Liquefied Petroleum Gas, Commercial-Grade Liquefied Propane, "P-Rick Furnace Feed"

### Chemical Family:

Petroleum Hydrocarbon, Aliphatic Hydrocarbon, Paraffin, Alkane

Components - may contain variable amounts of:

Propane  
Propylene  
Butane  
Iso-Butane  
Ethane  
Ethyl Mercaptan  
Sulfur

### Extinguishing Media:

Dry chemical, foam, carbon dioxide (CO<sub>2</sub>), Halogenated extinguishing agent

### Special Fire Fighting Procedures and Precautions:

**EXTREMELY FLAMMABLE!** Evacuate area of all unnecessary personnel. Use NIOSH/MSHA approved self-contained breathing apparatus, shut off source, if possible. Water fog or spray may be used to cool exposed equipment and containers. Allow fire to burn until gas flow is shut off, if possible.

### Unusual Fire and Explosion Hazards:

This material releases flammable vapors at well below ambient temperature and will readily form flammable mixtures with air. Exposed to an ignition source, it will burn or be explosive in confined areas. Its vapors are heavier than air and may travel long distances to an ignition source

then flash back explosively. Alkane and chlorine gas mixtures have produced explosions.

### Health Hazards:

Contact with liquefied gas may result in eye and/or skin freeze burns. Inhaling high vapor concentration may produce CNS depression evidenced by giddiness, headache, dizziness, visual disturbances, muscular weakness, tremors, drowsiness and nausea; in extreme cases, unconsciousness, asphyxiation and death may occur.

-- End of Report --